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Exhibit 5

SFUND-2001-0009-0135

154815

MENZIE-CURA & ASSOCIATES, INC.
COMMENTS ON SAUGET AREA 2
HRS SCORING

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Technical Report - Comments on Sauget Area 2 HRS Scoring
December 11, 2001

Introduction

This technical report provides comments on the United States Protection Agency's (USEPA) recent Hazardous Ranking System (HRS) scoring of Sauget Area 2 in St. Clair County, Illinois. The USEPA presented this scoring in the HRS Documentation Record and Supporting References (HRS Record).

These technical comments are based on our review of the HRS Record and in-depth knowledge of Sauget Area 2[1]. The report analyzes the scoring on the basis of its conformance to USEPA's Hazardous Ranking System Guidance Manual (EPA OSWER, 1992a), the regulations in 40 CFR Part 300, and state-of-the-practice site assessment and scientific methods.

Figure 1 shows the general area and the five sources referred to in the HRS record. They are:

HRS Record Source Number	Source Name	Description in Record
1	Site O	Four inactive sludge dewatering lagoons associated with the Village of Monsanto/Sauget Wastewater Treatment Plan
2	Site P	A former Illinois Environmental Protection Agency (IEPA) permitted landfill
3	Site Q	An inactive landfill
4	Site R	A former industrial waste landfill
5	Site S	A former landfill

As indicated below, our review found that USEPA's HRS scoring was inappropriately applied in several respects. The HRS Documentation Package contains several critical errors that yielded scores well above those that would have been calculated had the site(s) been properly represented. Misrepresentations contained within the package include:

[1] Menzie-Cura & Associates, Inc. performed extensive surface water, sediment, and fish sampling in the Mississippi River in support of a draft ecological risk assessment performed as part of the Resource Conservation and Recovery Act (RCRA) Correction Action for Solutia's Krummrich plant.

1. Aggregation of disparate sources into one site for the purposes of HRS listing;
2. Lack of documentation of a release by direct observation or an observed release by chemical analysis;
3. The use USPEA made of data that does not conform to USEPA's own data quality standards;
4. The underlying assumptions in the HRS scoring regarding bioaccumulation are not occurring in the Mississippi River.

This report includes two sections:

Section 1: Technical Comments; and

Section 2: Re-scoring Based on Technical Comments.

We re-scored Sauget Area 2 based on our review of the HRS Record and site-specific observations made over the last several years. HRS Guidance was adhered to in re-scoring the site. When USEPA's misrepresentations are corrected, the site scores for Sites O, P, Q, R, and S, aggregated and individually, decrease to 0. These scores are based on both components of the Surface Water Migration Pathway.

1.0 Technical Comments

We have organized the technical comments around seven issues that are either misrepresentations of site conditions, inappropriate application of HRS Guidance, or errors of interpretation on the part of the writers of the HRS Documentation Package for Sauget Area 2.

1.1 Aggregation

USEPA (1992) in its HRS Guidance (p. 9) indicates that the aggregation of sources into a single site is a decision that should be based on the following criteria:

1. Proximity of the sources to each other;
2. Similarity of wastes contained in the sources;
3. Similarity of targets (e.g., potential to affect one or more of the same aquifers, surface water bodies, sensitive environments, or population); and,
4. Common owner, operator, or potentially responsible party (PRP).

Although the Area 2sites are located west of Route 3 in Sauget, Cahokia, and East St. Louis, Illinois, the five sources comprising Sauget Area 2 do not meet any criteria for which USEPA rules permit site aggregation to be based. The USEPA has not provided documentation that these

five sites (out of the entire industrialized region of Sauget and Cahokia, Illinois, as shown in Figure 2) should be aggregated.

1.1.1 Proximity of Sources and Similarity of Migration Pathways and Targets

Proximity of sources has potential implications for whether the disparate sources contribute in a combined way to one or more exposure pathways on which the scoring is based. Sauget Area 2 is scored based on whether the sources:

1. contribute contaminants to the Mississippi River via overland flow or groundwater transport; and/or
2. contribute contaminants to wetlands adjacent to the river via either overland flow or groundwater transport. The HRS identifies these wetlands as being present in Site Q (Source 3).

The HRS Documentation Package articulates this conceptual view in the following sections:

> Section 4.1 Overland/Flood Migration Component
>
> Hazardous substances found in surface waste collected from the sources may mix with runoff during storm events and flow in the direction of the Mississippi River and adjacent wetlands. This migration of hazardous substances poses a threat to the fishery located immediately downstream of the site and to the endangered species and wetlands on and adjacent to the site.
>
> Section 4.2 Ground Water to Surface Water Migration Component
>
> The ground water located beneath the site is contaminated with hazardous substances linked to the sources at the surface. This ground water, as explained below, is allowed to flow freely below the site and the levee, toward the Mississippi River during times of normal and low flow (Ref. 17, p. F-1). This migration of hazardous substances poses a potential threat to the fishery located immediately downstream of the site and to the endangered species and wetlands on and adjacent to the site.

This conceptual view of the Sauget Area 2 can be viewed as a simple conceptual model:

Source → Pathway → Receptor (or Target)

Basing site aggregation on an overall conceptual model is implied by the criteria identified for

such aggregation. Over the past decade, USEPA has been stressing the importance of using conceptual models to structure and evaluate environmental problems.

A careful examination of the characteristics of the five sources indicates that they do not fit into a common conceptual model. That is, they do not share the same Source → Pathway → Receptor relationships.

The evaluation provided below is based on a review of the HRS Documentation Record. It illustrates the extent to which the record has considered or even demonstrated the two major migration pathways for the five sources. These sites are shown in Figure 1.

1.1.1.1 Site O

Site Description: The HRS Documentation package states that Site O consists of four inactive sludge dewatering lagoons associated with the Village of Monsanto/Sauget Wastewater Treatment Plant (WWTP). The source is located on Mobile Avenue in Sauget, east of the flood control levee. The source covers approximately 20 acres to the northeast of the American Bottoms WWTP. The lagoons have been covered with clay and vegetated, and the wastes removed. No waste material is present at the surface (Ref. 5, p. 15).

Potential for Overland Flow to River or Wetlands:

This site appears very unlikely to contribute contaminants to the river or to the wetlands/habitats because:

- as stated in the HRS Documentation, the lagoons have been covered with clay and are vegetated, the wastes removed, and no waste material is at the surface;
- the site is separated from both the river and from the wetlands by a levee.

Potential for Groundwater Flow to River or Wetlands:

The site appears very unlikely to contribute contaminants to the river or to wetlands/habitats because:

- as stated in the HRS Documentation, the two "hazardous compounds" observed in soil samples for this site were low levels of manganese and vanadium. The groundwater data are not usable for HRS scoring (refer to Section 1.3).
- the wetlands in Site Q are not downgradient of Site O. They are on opposite sides of the flood control levee and the wetlands are over a half a mile south of Site O.

Conclusion: With respect to the migration pathways and potential hazards to targets, the HRS record does not support inclusion of Site O within Sauget Area 2. The implications for scoring Site O individually are discussed in Section 2.1.

1.1.1.2 Site P

Site Description: The HRS Documentation package states that the Site is an inactive, IEPA-permitted landfill covering approximately 28.6 acres in Sauget and East St. Louis, Illinois (Figure 1; Ref. 14, p. 19). This landfill is located on the east side of the flood control levee (Figure 1). The source is bordered on the west by the Illinois Central Gulf Railroad; on the south by Monsanto Avenue, and on the east by the Terminal Railroad Association railroad. The two railroads converge to delineate the north boundary (Ref. 7, p. P-1). Surface drainage is to the south-central portion of the source, which was not landfilled due to the presence of a potable water line in this area.

Potential for Overland Flow to River or Wetlands:

This site appears very unlikely to contribute contaminants to the river or to the wetlands/habitats because:

- this is the most northern and distantly located source, and it is physically separated from all other locations by roads, rail lines, or other structures; Figure 1 shows that runoff from this site is unlikely to contribute contamination to the river, or to the designated wetlands along the river because Site P is east of the flood control levee and approximately one mile north of the wetlands;
- as stated in the HRS Documentation, this is an inactive permitted landfill which was not used as a chemical waste landfill (violations related to containers did occur but as far as the record shows, there were no violations related to actual waste disposal);
- the site is separated from both the river and from the wetlands by a levee.

Potential for Groundwater Flow to River or Wetlands

The site appears very unlikely to contribute contaminants to the river or to wetlands/habitats because:

- USEPA used groundwater sample location G-109 as a background location for groundwater. This well is west and downgradient of Site P (i.e., between the river and Site P). Since USEPA used this well as background, they assumed it to be free from site contaminants; thus, it can be concluded that Site P is a negligible source of contaminants to the river via groundwater transport. In addition, the groundwater data used in the HRS scoring document

are of undocumented quality and thus unusable for use in HRS scoring (refer to Section 1.3);
- the geographic location of Site P would preclude it from being a contributor to contaminants in the wetlands in Site Q because it is over one mile north of the wetlands.

Conclusion: With respect to the migration pathways and potential hazards to targets, the HRS record does not support the inclusion of Site P within Sauget Area 2. The implications for scoring Site P individually are discussed in Section 2.1.

1.1.1.3 Site Q

Site Description: The HRS Documentation package states that Site Q is an inactive waste landfill in Sauget, Illinois that USEPA now claims covers approximately 225 acres (Ref. 14, p. 8—previous agency reports state 90 acres). The facility was operated by Sauget & Company between 1966 and 1973 (Ref. 7, p. Q-1). The source is located on the east bank of the Mississippi River and is on the west side of the flood control levee (Figure 1; Ref 7, p. Q-1). A railroad spur divides the source and several ponds, currently dry exist on the unoccupied southern portion.

Potential for Overland Flow to River or Wetlands: Unlike Sites O, P, and S, Site Q is located adjacent to the Mississippi and is west of the levee. Thus it is geographically located in an area where overland flow to the river is at least possible. For this reason, it should be evaluated separately from Sites O, P, and S..

The chemical data collected by IEPA in 1999 and provided in the HRS Documentation Package at (pages 22 and 23) for Site Q are from samples taken from depths of 10 to 23 feet below the ground surface. Therefore, they cannot be used to indicate whether these contaminants could migrate from the site via overland runoff. For example, the 1999 sample results cited to describe this source, and the associated sample depths are:

Sample Identifier (IEPA, 1999)	Sample Depth in Feet Below Ground Surface
X102	21 – 23
X103	10 – 12
X104	16 – 18
X111	14 – 17

No validated data are provided in other parts of the HRS Documentation Package (i.e., for the sections on the Surface Water Migration Pathway) that document surface soil contamination. Anecdotal information is provided on drums observed on the ground surface. However, based on our review of the drum chemistry data and the HRS Documentation, there is nothing in the record to indicate that the drums used to document a release by direct observation were the same

drums for which USEPA presented chemical data. The available soil data for the southern wetlands (Sample X106 taken in 1999) indicate negligible contamination. (Note, however, like the other samples, this one was taken at depth, although a somewhat shallower level (about 6 feet)).

Because of location adjacent to the river and west of the levee, Site Q should be separated from Sites O, P, and S which are located behind (east of) the levee.

Potential for Groundwater Flow to River or Wetlands: Site Q is located adjacent to the river and according to USEPA has wetlands in the southern portion. Therefore, unlike Sites O, P, and S, there is at least a potential for this transport pathway. However, USEPA has not presented validated data that demonstrate this pathway.

Regardless of whether or not Site Q has the potential for contributing contaminants to the river via groundwater, it should be separated from Sites O, P, and S, which appear to pose a negligible hazard.

Conclusion: With respect to the migration pathways and potential hazards to receptors, the HRS record supports separating Site Q from Sites O, P, and S for Sauget Area 2. Site Q should be separated from Site R for other reasons discussed below. The implications for scoring Site Q individually are discussed in Section 2.1.

1.1.1.4 Site R

Site Description: The HRS Documentation package states that Site R is a former industrial waste landfill situated adjacent to the Mississippi River in Sauget, Illinois (Figure 1). The source is located north and west of Site Q on the river (west) side of a flood control levee (Ref. 7, p. R-1).

Potential for Overland Flow to River or Wetlands: Unlike Sites O, P, and S, but like Site Q, Site R is located adjacent to the Mississippi and is west of the levee. Thus it is geographically located in an area where overland flow is at least possible. For this major reason, it should be separated from Site O, P, and S (Sources 1, 2, and 5). Overland flow from Site R would not reach the wetlands at the southern end of Site Q, because they are approximately 0.5 miles south of Site R. Among other factors, this issue distinguishes Sites R and Q.

As in the case of Site Q, the chemical data presented for Site R to document it as a potential source are not taken from the land surface. For example, the 1992 samples cited to describe this source and their associated sample depths are as follows:

Sample Identifier	Sample Depth in Feet Below Ground Surface
SB 14	20 – 22
SB 14	30 – 32
SB 15	16 – 18
SB 16	16 - 18
SB 16	28 – 30

No other data are provided in other parts of the HRS Documentation Package (i.e., in the sections on Surface Water Migration Pathway) that document surface soil contamination.

Because of Site R's location, it should be separated from Sites O, P, and S which do not have any potential to contribute contaminants to the river by surface runoff.. It should also be separated from Site Q because runoff from Site R cannot affect wetlands. Runoff from Site R cannot reach the wetlands, which USEPA identifies on the southern end of Site Q, approximately 0.5 miles to the south.

Potential for Groundwater Flow to River or Wetlands: Site R is located adjacent to the river. Therefore, unlike Sites O, P, and S there is at least a potential for this transport pathway. However, USEPA has not presented validated data that demonstrate this pathway.

Regardless of whether or not Site R has the potential for contributing contaminants to the river via groundwater, it should be separated from Sites O, P, and S which appear to pose a negligible hazard.

Conclusion: With respect to the migration pathways and potential hazards to receptors, the HRS record supports separating Site R from Sites O, P, and S for Sauget Area 2. As is discussed later in this section, Site R should be separated from Site Q because of different operational histories and PRP responsibility. The implications for scoring Site R individually are discussed in Section 2.1.

1.1.1.5 Site S

Site Description: The HRS Documentation package states that Site S is depicted on the USGS topographic map as a low-lying feature located to the west of the American Bottoms WWTP (Figure 1). The source is currently part of the American Bottoms WWTP property which is situated to the west-southwest of the Site O (Source 1) lagoons on the east side of the flood control levee. The northern portion of Source S is grassed with no apparent features of waste disposal, and the southern portion is covered with
gravel and fenced (Ref. 5, p. 33).

Potential for Overland Flow to River or Wetlands: This site appears very unlikely to contribute contaminants to the river or to the wetlands/habitats because the site is separated from both the river and from the wetlands by a levee.

Potential for Groundwater Flow to River or Wetlands: The site appears unlikely to contribute contaminants to the river or to wetlands/habitats because, of the three wells sampled at this site, only one had detected concentrations of contaminants, and these consisted primarily of petroleum-related volatile organic compounds and a few other volatile and semi-volatile compounds. None of the compounds detected in groundwater in Site S correspond to compounds for which an observed release was documented. In addition, the groundwater data are of unknown quality and are therefore not usable in HRS Scoring.

Conclusion: With respect to the migration pathways and potential hazards to targets, the HRS record does not support the inclusion of Site S within Sauget Area 2. The HRS record supports separating Site S from Sites O, P, Q, and R for Sauget Area 2. The implications for scoring Site S individually are discussed in Section 2.1.

1.1.2 Similarity of Wastes, Types of Operations, Owners, and PRPs

USEPA provides a weak rationale for lumping the individual sites into one large site. Historically, the "sources" identified in the HRS Documentation package have all been considered separate and distinct sites by USEPA and IEPA. That is reflected in the terminology they have historically used to refer to the sites: Site O, Site P, Site Q, Site R, and Site S. The various agency-sponsored investigative reports refer to the sites in this way. This classification reflects the distinct features of the sites which in turn reflects dissimilarities among the sites with respect to wastes, types of operations, owners, and PRPs.

The five sources identified by USEPA in Sauget Area 2 should not be aggregated into a single site for several reasons. The sources in Sauget Area 2 are not owned and operated by the same entity, they were subject historically to different waste disposal practices, and they represent different source types. For all of these reasons, separate source scores would more accurately reflect the hazards associated with each source.

The five sources in Sauget Area 2 were historically subject to different waste disposal practices and represent different source types. Based on contaminant concentration data included in the HRS Record, contaminant types and concentrations vary from one source to another. Despite these differences, USEPA attributes a common pathway for overland and groundwater migration to surface water for the combined sources. It is clear from the discussion provided above that the sites differ substantially in the degree to which they have a potential for affecting surface waters.

The sources in Sauget Area 2 are former soil-covered WWTP lagoons, permitted non-chemical landfills, and landfills that were intended for chemical waste disposal. As is clear from the source descriptions given above, these sources were not part of the same operation which deposited similar substances using similar disposal practices. These were all in fact distinct operations involving and accepting wastes from different groups of PRPs. Site R (Source 4) was owned by Monsanto and was intended for disposal of Monsanto process wastes only, Site P (Source 2) was permitted for disposal of Monsanto general refuse and Ethyl filter cake and received waste of other PRPs, and Site Q (Source 3) was used as a landfill by various generators of both municipal and industrial waste.

The HRS Documentation package provides somewhat confusing and misleading information as to the history and background of Site S (Source 5): at one point Site S is described as a "still-bottom disposal area for Clayton Chemical," however the source identification description for Site S contained only the ambiguous statement that "it appears the site was used for drum disposal based on a review of historical aerial photos." There is no support in the HRS documentation that Source 5 was the same operation as the other sources. Similarly, Site O (Source 1) was affiliated with the operation of the Sauget Wastewater Treatment Plant and had no common operation with any of the other Sauget Area 2 sources. Differing from the other sources, Site O is not a landfill, but was once a drying area for WWTP sludges.

The information contained in the scoring package does not demonstrate that the substances disposed and means of disposal at the Sauget Area 2 sites were the same. While some of the same chemicals were detected in two or more sources, there is little overlap among the sources. Perhaps one of the best examples of the effort to link sources on the basis of chemicals is Site O (Source 1). For this source, the HRS Documentation Package mentions the presence of two metals (manganese and vanadium) in surface soil. Neither chemical is associated with the bioaccumulative compounds such as PCBs found at some sites that "drive" the scoring process. This argument is not a logical basis for site aggregation.

The means of disposal and materials disposed at Sites O and S differ in all respects from the other sources in that according to USEPA, disposal activities at Site O involved only WWTP sludge and Site S contained still bottoms from the operations at Clayton. This contrast is highlighted in the scoring package by the list of hazardous substances in surface soil at Site O that includes only manganese and vanadium.

The HRS record documents that the intent behind the operations at Sites P, Q, and R was to specifically limit the type of waste being disposed at each source, i.e., Monsanto process wastes in Site R, municipal and industrial waste from various PRPs in Site Q, and filter cake and general refuse in Site P. There is no demonstrated connection between any disposal activities that may have occurred at Site S and the other Sauget Area 2 sources.

The aggregation of the Sauget Area 2 sources also does not meet the "same PRP" criterion. The list of PRPs for Site O will presumably include every documented industrial user of the WWTP from 1952 to the late 1980s, while the list of PRPs for Site S appears to be as yet undetermined but could potentially include all of Clayton's customers during the relevant time period. The list of PRPs for Site R is relatively short; however, over one hundred PRPs have already been identified by USEPA as participants in a proposed RI/FS for Area 2, most of which were culled from Site Q lists.

1.1.3 Clean up Strategy

The scoring package provides no support for the idea that a "single strategy for cleanup" will be appropriate at the non-contiguous Sauget Area 2 sources. Clearly, the non-contiguous sources located outside the levee will have to be cleaned up individually using different methods in light of the unique nature of waste disposal conducted at each of these sources. Other factors will also require a separate plan for clean up at each of these sources, including the existence of wetlands USEPA identifies at Site Q and the enormous range of hazardous substances identified at the sources. Moreover, the proximity of Sites Q and R to the Mississippi River and the absence of an overland/flood migration component for Sites O, P, and S means that completely different cleanup strategies will be needed for the sources located inside the levee versus Sites O, P, and S.

USEPA attempts to link the clean up activities at the Sauget Area 2 sources by suggesting that "contamination from each of the sources has combined in the ground water to form a plume which cannot be identified with a single source." This ignores the numerous other sources located in the vicinity of Sauget Area 2 with a documented history of groundwater contamination that are unquestionably contributing to the same groundwater plume, and the fact that EPA has included very little information about the depth, quality, and extent of the groundwater contamination

Site R is already the subject of a separate clean-up program. Specifically, USEPA has recently required a focused feasibility study specific to Site R[2].

1.2 USEPA Does Not Establish an Observed Release for the Surface Water Pathway

USEPA's evidence provided in the HRS document in support of an observed release for the Surface Water Pathway is flawed. As described below and detailed in the Data Usability Assessment in Section 1.3, USEPA does not adequately establish an observed release via the Overland/Flood Migration component or the Groundwater to Surface Water Migration component of the Surface Water Pathway due to flawed data, non-compliance with regulatory requirements, and lack of integrity of the direct observation data.

[2] November 14, 2001 letter from Mike Ribordy (USEPA).

1.2.1 Observed Release Not Established for Overland/Flood Migration Component

Two lines of evidence, both flawed, are presented by USEPA to establish an observed release via the Overland/Flood Migration component of the Surface Water Pathway. These are 1) Observed release by direct observation – flooding, and 2) Observed release by chemical analysis.

1.2.1.1 Data Do Not Support Observed Release by Direct Observation

The data used to support a direct release by direct observation are not usable for HRS purposes for two reasons. The first is that the data do not meet the data usability requirements of the HRS. The second is that the observations used to support "direct observation" are not linked in time and/or space. Thus, the "direct observation" is presumed by assembling data that may not be related.

Data Quality Issue: The USEPA presents data from soil sampling one year after the 1993 flood as evidence of "direct observation" of a release via the overland/flood migration component of the surface water pathway. USEPA guidance requires that only data of known quality and known bias can be used to establish an observed release (USEPA, 1996). These soil data collected by IEPA in 1994 (Reference #25, and as tabulated in the HRS pp. 35-36) are not usable to establish an observed release because they are not validated and are therefore of unknown and undocumented quality (see Data Usability Assessment, Section 1.3 below for further details).

Space and Time Issue: Additional evidence presented by USEPA for "direct observation" includes drum waste sample data collected from drums excavated at Site Q in 1999 (Reference #8 and tabulated in HRS pp. 36-38). These data are unusable to support an observed release by direct observation because the HRS record (Reference #8 and #13) fails to clearly establish a direct link between drums observed at the surface following the 1993 flood (and therefore potentially exposed to flood waters) and the drum data from 1999 (6 years later) that are presented in the HRS. Additionally, there are numerous data usability issues that render individual chemicals reported for these drum data unusable (see Data Usability Assessment, Section 1.3 below).

1.2.1.2 Data Do Not Support Observed Release by Chemical Analyses

Section 4.1 of the HRS Documentation Package describes the Overland/Flood Migration Component of the Surface Water Migration Pathway. Subsection 4.1.2.1.1 describes the technical bases for the observed release via this component. Sediment samples are provided for the river to support the occurrence of this release via overland or flood migration (pp. 39-41 of HRS Documentation Package.) These data are flawed in several respects. Further, they do not support an observed release for the various sources listed in the HRS Documentation Package.

Data Issues: The data presented in the HRS to document the observed release by chemical analysis were flawed for several reasons. First, three of the four "background" sediment sample locations are in the Mississippi River upstream of Site R but downstream of Site P. These "background" samples are inappropriate to define background for potential releases from Site P because they are downstream of this potential source. Therefore, no appropriate data are presented to establish an observed release by overland/flood migration for Site P. (Refer to Section 2.1.2 for the effect of the lack of an observed release on the scoring for Site P.)

Additionally, the "background" and "release" sediment data are flawed in that most of the release sample locations are not similar (not comparable) to the background locations, based on chemical evidence of total organic carbon measurements at these locations. Therefore, many of the release sample results are considered unusable to establish an observed release by chemical analysis. This issue is further discussed in the Data Usability Assessment, Section 1.3.

Inappropriate Application of Sediment Data to various Sources and Pathways: The sediment data collected by Solutia and for USEPA by Tetra Tech in 2000 were collected in the Mississippi River off Site R. Data for the following compounds are provided in a table within the HRS Documentation Package: chlorobenzene, 4-chloroanaline, 1,4-dichlorobenzene, and 4,4'-DDD. There are no surface soil samples from Site R that support the premise that these compounds are present in surface soils (or even near-surface soils) within Site R. The pathway linking a flood or overland flow across the surface of Site R and the occurrence of these chemicals in sediments in the river is simply not supported for Site R. The river studies undertaken by Solutia and USEPA had nothing to do with evaluating runoff from Site R and should not be used in the HRS Documentation Package as an indicator of such a pathway. The presence of chemicals in sediments off Site R does not support an observed release from Site R via the overland flow/flood component.

No sediment samples were taken off Site Q, which is located south and downstream of Site R. The southernmost samples collected by USEPA are at the southern end of Site R and, therefore, upstream from Site Q. This is consistent with the purpose of the 2000 sampling program carried out by Solutia and USEPA which was to evaluate conditions in the river off Site R. Site Q was not a subject of the investigation.

Overland flow and flood transport from Site Q would not be transported and deposited in sediment off Site R. Even during low flow periods, the current velocities along the face of the river past Site Q are on the order of 4 knots (nautical miles per hour). At high flows and during floods, the currents would race by the face of Site Q at higher velocities. Overland flow from Site Q, to the extent that it occurs, would enter the river south of Site R, i.e. downstream from Site R. Runoff from Site Q can not result in the presence of substances in river sediment off Site R. For these reasons, the presence of chemicals in sediments off Site R can not be used to support an observed release for Site Q.

1.2.2 Observed Release Not Established for Groundwater to Surface Water Migration Component

USEPA fails to establish an observed release for the Groundwater to Surface Water Migration component of the Surface Water Pathway because the data presented are unusable for this purpose. All of the groundwater data presented, collected in 1999 and tabulated on pp. 55-59 of the HRS (Reference #9) are unusable to establish an observed release because the data are of unknown and undocumented quality (not validated). USEPA guidance (USEPA Guidance for Performing Site Inspections Under CERCLA, 1992 and Using Qualified Data to Document an Observed Release, 1996) clearly requires that only data of known and documented quality can be used to establish an observed release. This issue is further discussed in the Data Usability Assessment Section 1.3 that follows.

1.3 Much of the Data used in the HRS Document are of Unknown Quality

As an associate of Menzie-Cura & Associates, Inc., Susan D. Chapnick, M.S., of New Environmental Horizons, Inc. (NEH) conducted a data usability assessment of a subset of the chemical data used by USEPA in the HRS scoring of Sauget Area 2, St. Clair County, Illinois. Data usability is the process of assuring or determining that the quality of the data meets the needs for the intended use(s) of the data. The purpose of this data usability review was to determine the usability of the data for HRS scoring. The Data Usability Assessment is based upon the data and information included in HRS Documentation Record (including the supporting References), professional judgment, and the following EPA technical guidance documents:

1. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* USEPA Office of Solid Waste and Emergency Response, EPA-540/R-94-013, PB94-963502, February 1994.
2. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review.* USEPA Office of Solid Waste and Emergency Response, EPA-540/R-94/012, PB94-963501, February 1994.
3. *Using Qualified Data to Document an Observed Release and Observed Contamination.* USEPA Office of Solid Waste and Emergency Response, EPA/540/F-94/028, PB94-963311, November 1996.
4. *Hazard Ranking System Guidance Manual.* USEPA Office of Solid Waste and Emergency Response, EPA 540-R-92-026, PB92-963377, November 1992. Interim Final.
5. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* USEPA Office of Solid Waste and Emergency Response, SW-836, Final Update 1996.

6. *USEPA Guidance for Performing Site Inspections Under CERCLA.* USEPA Office of Emergency and Remedial Response, EPA540-R-92-021, PB92963375, September 1992. Interim Final.

Specific results for chemicals used to determine the HRS for listing purposes must meet DUC-I and DUC-II level rigorous data quality requirements (pg. 100, *Guidance for Performing Site Inspections Under CERCLA*, USEPA 1992). NEH's data usability assessment focused on the data used to support the observed releases for the overland/flood migration component and the groundwater to surface water migration component of the surface water pathway.

1.3.1 Summary of Deficiencies in Data Used by USEPA to Establish Observed Release

NEH reviewed a subset of the data presented in the HRS Record for Sauget Area 2. Data were obtained from the HRS Record as listed in the References, pp. 11-12 of the HRS. Table 1 lists the references reviewed, the technical and documentation deficiencies found, and the effect of these deficiencies on the usability of the data to establish an observed release. Usability evaluations were based on the regulatory guidance given in the documents referenced in above. Reference numbers are those used in the USEPA HRS document. Further discussions of the technical deficiencies, non-compliance with regulatory guidance, and usability assessments are discussed in Section 1.3.2 below.

Table 1. Deficiencies in Results Reviewed during Data Usability Assessment of Observed Release – Surface Water Pathway

Reference Number	Description*	Comments	Affect on Usability of Data to Establish Observed Release
25	Illinois EPA. Sample data from Source Q, 1994. (Soil data)	Soil sample result data sheets and laboratory narrative for Site Q. Deficiencies: Data were not validated, no quality control (QC) results presented, lab narrative indicates QC deficiencies and uncertainties in reported results that were not evaluated by USEPA prior to use in HRS, no documentation of bias.	Unusable – all soil results presented are unusable because unvalidated data fail to meet criteria for establishing observed release based on regulatory guidance (USEPA 1992, 1996)
8	Ecology & Environment, Inc. Draft of Federal On-Scene Coordinator's Report for Area 2 Site Q, 2000. (Drum + Soil data)	Drum and Soil tabulated validated results for Site Q. Deficiencies: No data validation report to document bias in estimated results, no sample result data sheets, units are inconsistent and might be incorrect for organic compounds, no QC results presented, USEPA did not use regulatory guidance (USEPA 1996) to account for potential bias in results.	Applying USEPA 1996 guidance, the following results presented in "Drum Samples" table, pp. 36-38 of HRS, are unusable: 1,1-dichloroethane 1,2,3-trichlorobenzene 1,4-dichlorobenzene 2-methylnaphthalene 2,4-dichlorophenol 2,4,6-trichlorophenol benzene di-n-butylphthalate sec-butylbenzene tetrachloroethene

Reference Number	Description*	Comments	Affect on Usability of Data to Establish Observed Release
23	USEPA Validated Sediment Sampling Results from the Mississippi River, 2000. (Sediment data)	Tabulated validated Sediment sample results of USEPA split samples taken during Solutia sampling event (Oct.-Nov. 2000) plus selected sample data sheets and two page narrative concerning extent and levels of contamination. Deficiencies: No data validation report to document bias in estimated results, missing many sample result data sheets, no QC results presented, grainsize data missing.	Using total organic carbon (TOC) to evaluate comparability of "background" and "release" samples, the following sample data (tabulated in HRS p. 40) are unusable: PD-8-60, PDA-5-R-60, SD-5-150, PDA-2-60, and SD-6-90. Applying USEPA 1996 guidance, result for SD-2-50 is unusable.
9	Illinois EPA Analytical Data Sheets from Samples Collected May-June 1999. (Groundwater data)	IEPA laboratory groundwater sample result data sheets plus laboratory narrative. Deficiencies: Data were not validated, lab narrative indicates QC deficiencies and uncertainties in reported results that were not evaluated by USEPA prior to use in HRS, no QC results presented, no documentation of bias.	Unusable – all groundwater results presented are unusable because unvalidated data fail to meet criteria for establishing observed release based on regulatory guidance (USEPA 1992, 1996)

*Complete Reference titles are available in the HRS pp. 11-12.

1.3.2 Deficiencies in Data Quality for Establishing an Observed Release – Technical Deficiencies and Non-compliance with Regulatory Guidance

USEPA regulatory guidance requires that only data of known and documented quality, or validated data, can be used to establish an observed release (HRS Guidance Manual, 1992). Furthermore, the reasons for the qualifications taken during validation, i.e., bias in the data, must be documented for the data to be used in the HRS. Section 5.1, Review and Validate Analytical Data, in *Guidance for Performing Site Inspections Under CERCLA*, USEPA 1992, states that "the additive nature of QC factors out of specification is difficult to assess, but the reviewer should inform the user about data quality and limitations. This helps avoid applying the data inappropriately, while still allowing

exclusion of the data." The "reviewer" is the data validator. Furthermore, Section 5.2, Identify Analytical Data for Scoring, states "qualified data may be used only if the bias (unknown, low, high) associated with the data and the reasons for qualification are known. Some qualified data still may not be appropriate to develop a score for listing.....Analytical data of unknown quality are generally not adequate to score a site." USEPA makes the distinction between data quality required for scoring or listing a site (more stringent) and data quality required for screening investigations. USEPA defines data use categories (DUC) for screening and listing sites. These are defined in Table 5-2 of the CERCLA guidance (USEPA 1992). For listing a site, the DUC-I is recommended for observed release as well as the DUC-II level.

The guidance provided in *Using Qualified Data to Document an Observed Release*, USEPA 1996, details the conditions for use of validated data that are qualified, i.e., estimated data (qualified "J" or "UJ" during validation) and tabulates factors that compensate for the bias in the estimated data used for both release and background sample determinations. In summary, this guidance requires only validated data be used to establish an observed release and allows for the use of high biased background data and low bias release sample data. However, "high bias release data and low bias background data may not be used at their reported concentrations because they do not establish an observed release with certainty" (USEPA 1994). In such cases, this guidance provides adjustment factors which compensate for the probable uncertainty in the measurements. USEPA did not use this 1996 guidance for some of the data presented to establish an observed release (overland/flood migration component) and then used this guidance incorrectly for other data presented in the HRS (groundwater to surface water component), as further described below.

1.3.2.1 Overland/Flood Migration Component – Observed Release by Direct Observation

USEPA failed to use their guidance document, *Using Qualified Data to Document an Observed Release* (USEPA 1996) for the data presented in the overland/flood migration component, HRS tables pp. 35-38 (Reference #25 and #8). Additionally, for the 1994 post-flood data tabulated in the HRS pp.35-36 (Reference #25), data validation was not performed. The implications for HRS scoring are discussed in Section 2.1.1.

USEPA 1996 guidance clearly states "EPA procedures require that CLP analytical data be reviewed, or validated by EPA or third party reviewers, to ensure that the data are of known and documented quality and that the determination be discussed in a data validation report that accompanies the analytical results." Unvalidated data are not usable to establish an observed release because without validation the data are of unknown quality and therefore do not satisfy either USEPA requirements specified in *Guidance for Performing Site Inspections Under CERCLA*, USEPA 1992, or in *Using Qualified Data to Document an Observed Release*, USEPA 1996. Therefore, all the 1994 soil data presented in the HRS (pp. 35-36) to establish an observed release for the overland/flood migration component are not usable for this purpose.

Additional evidence presented by USEPA for "direct observation" include drum waste sample data collected from drums excavated at Site Q in 1999 (Reference #8 and tabulated in HRS pp. 36-38). These data are unusable to support an observed release by direct observation because the HRS record (Reference #8 and #13) fails to clearly establish a direct link between drums observed at the surface following the 1993 flood (and therefore potentially exposed to flood waters) and the drum data from 1999 that are presented in the HRS. Furthermore, the drum data presented in the HRS represent a combination of individual and "composite" drum samples collected during excavation; the supporting report (Reference #8) does not document that these drums were the ones that were "observed" at the surface following the 1993 flood. Indeed many of the drums were excavated from below grade and not from the surface (Reference #8). The integrity of the data are compromised because USEPA failed to establish a direct association between the drums "observed" in 1993 and the drum data collected in 1999, 6 years later. Additionally, there are numerous data usability issues that render individual chemicals reported for these drum data unusable, as further described below.

USEPA 1996 guidance states that only results detected at levels greater than the contract required quantitation limit (or contract required detection limit, these terms are used interchangeably in the guidance), CRQL, or sample quantitation limit (SQL) are usable to establish an observed release and observed contamination for HRS purposes. Specifically, the guidance states "Detection below the CRQL is treated as non-quantifiable for HRS purposes" (p.4 USEPA 1996). In addition, this regulatory guidance states that ""J" qualified data with concentrations below the CRQL can not be used to document an observed release," except in specific cases of "UJ" (non-detected results at estimated detection limits). Many of the results that USEPA tabulated in the HRS (pp. 35-38) cannot be used to establish an observed release by overland/flood migration because they were found at levels less than (<) the CRQL. Table 2, below, lists the results that are unusable to establish the observed release because they are < CRQL.

Table 2. Chemical Results that are Unusable to Establish an Observed Release by Overland/Flood Migration Component [Found at Levels Less Than the CRQL]

Chemical	Sample ID	Concentration Reported + Lab Qualifier[1]	CRQL	Reference
2,4 Dimethyl phenol	X107	270 J µg/kg	434.2 µg/kg	25, p.30 (1994 IEPA soil data)[2]
2-Methylnaphthalene	D-112	270 J mg/Kg[3]	330 mg/kg[3]	8, p.B-14 (1999 E&E Drum data)
2,4-Dichlorophenol	D-246	130 J mg/Kg[3]	330 mg/kg[3]	8, p.B-14 (1999 E&E Drum data)
2,4,6-Trichlorophenol	D-246	34 J mg/Kg[3]	330 mg/kg[3]	8, p.B-14 (1999 E&E Drum data)
Anthracene	X111	62 J µg/kg	464.8 µg/kg	25, p.38 (1994 IEPA soil data)[2]
Benzene	X101	5 J µg/kg	13.5 µg/kg	25, p.23 (1994 IEPA soil data)[2]
Benzene	D-52	6.2 J mg/kg[3]	10 mg/kg[3]	8, p.B-12 (1999 E&E Drum data)
Benzo(a)anthracene	X109	89 J µg/kg	452.1 µg/kg	25, p.34 (1994 IEPA soil data)[2]
Benzo(a)pyrene	X109	84 J µg/kg	452.1 µg/kg	25, p.34 (1994 IEPA soil data)[2]
Benzo(b)fluoranthene	X111	110 J µg/kg	464.8 µg/kg	25, p.38 (1994 IEPA soil data)[2]
Chloroform	X102	10 J µg/kg	11.5 µg/kg	25, p.24 (1994 IEPA soil data)[2]
Chrysene	X111	110 J µg/kg	464.8 µg/kg	25, p.38 (1994 IEPA soil data)[2]
Cobalt	X101	18.7 mg/kg	67.4 mg/kg	25, p.16 (1994 IEPA soil data)[2]
Cyanide	X101	3.3 mg/kg	13.5 mg/kg	25, p.16 (1994 IEPA soil data)[2]
Di-n-butyl phthalate	X110	380 J µg/kg	464.8 µg/kg	25, p.36 (1994 IEPA soil data)[2]
Di-n-butyl phthalate	D-102	180 J mg/kg[3]	330 mg/kg[3]	8, p.B-14 (1999 E&E Drum data)
Fluoranthene	X109	160 J µg/kg	452.1 µg/kg	25, p.34 (1994 IEPA soil data)[2]
Isophorone	X107	210 J µg/kg	434.2 µg/kg	25, p.30 (1994 IEPA soil data)[2]

Chemical	Sample ID	Concentration Reported + Lab Qualifier[1]	CRQL	Reference
Phenanthrene	X109	76 J µg/kg	452.1 µg/kg	25, p.34 (1994 IEPA soil data)[2]
Pyrene	X109	170 J µg/kg	452.1 µg/kg	25, p.34 (1994 IEPA soil data)[2]
Sec-butylbenzene	D-102	55 J mg/kg[3]	330 mg/kg[3]	8, p.B-13 (1999 E&E Drum data)
Trichloroethene	X101	6 J µg/kg	13.5 µg/kg	25, p.23 (1994 IEPA soil data)[2]
Vanadium	X102	16 mg/kg	64.8 mg/kg	25, p.18 (1994 IEPA soil data)[2]

[1]The lab qualifier "J" means that the result was reported at a level below the CRQL.
[2]These IEPA 1994 soil data were not validated and are therefore not usable. This table is presented inclusive of these data to demonstrate that even if these results were validated, they would be unusable to establish the observed release because they were found at levels less than the CRQL.
[3]These compounds are usually reported in units of µg/kg; however, they were tabulated in Reference #8 in units of mg/kg. As the sample data sheets were missing from the HRS record, NEH could not verify the units of these measurements. Therefore, these results are potentially three orders-of-magnitude (1000 times) too high; i.e., the accurate results might be 1000 times lower than reported due to unit errors.

USEPA failed to apply the 1996 guidance adjustment factors to the 1999 Drum data presented in the HRS pp. 36-38. As previously stated, these data were validated; however, no validation report was present in the Reference #8. Therefore, USEPA guidance allows for a conservative approach to adjusting "J" qualified data when the bias is unknown. The guidance states to divide the "release" sample data by the adjustment factor given for the specific compound. These adjustment factors are tabulated in the guidance (USEPA 1996). Of the remaining drum data not already assessed as unusable in Table 2, above, five results were reported as estimated, qualified "J", in the HRS pp. 36-38. Table 3, below, shows these data, the appropriate adjustment factor from USEPA guidance, the adjusted result, and evaluation of usability.

Table 3. 1999 Drum Sample Results Adjusted Using USEPA Guidance and Usability Assessment to Establish an Observed Release by Overland/Flood Migration Component

Chemical	Sample ID	Concentration Reported + Validation Qualifier[1]	USEPA Adjustment Factor[2]	Adjusted 1999 Drum Sample Result[2]	Usability Assessment
1,1-Dichloroethane	D-01	29 J mg/Kg[3]	10	2.9 J mg/Kg[3]	Unusable – value is < CRQL of 10 mg/Kg[3]
1,2-Dichlorobenzene	D-246	230 J mg/Kg[3]	4.22	54.5 J mg/Kg[3]	Potentially Usable at adjusted concentration if units are correct - see note[3]
1,2,3-Trichlorobenzene	D-02	30 J mg/Kg[3]	4.83	6.2 J mg/Kg[3]	Unusable – value is < CRQL of 10 mg/Kg[3]
1,4-Dichlorobenzene	D-246	30 J mg/Kg[3]	6	5 J mg/Kg[3]	Unusable – value is < CRQL of 10 mg/Kg[3]
Tetrachloroethene	D-01	21 J mg/Kg[3]	10	2.1 J mg/Kg[3]	Unusable – value is < CRQL of 10 mg/Kg[3]

[1]The validation qualifier "J" means that the result was estimated due to some QC exceedance and/or was reported at a level below the CRQL.

[2]The bias in the qualified data is unknown because the validation report was not included in the HRS record (Reference # 8). Therefore, USEPA 1996 guidance requires a conservative adjustment of the "release" data by dividing the value found by an adjustment factor. Adjustment factors are tabulated in the USEPA guidance, Tables 1 and 2, pp. 11-15 (USEPA 1996). Results were adjusted by dividing the concentration found by the USEPA adjustment factor.

[3]These compounds are usually reported in units of µg/kg; however, they were tabulated in Reference #8 in units of mg/kg. As the sample data sheets were missing from the HRS record, NEH could not verify the units of these measurements. Results might be three orders-of-magnitude lower (1000 times) than reported.

Three polychlorinated byphenyl (PCB) aroclors were reported in the drum sample data: Aroclor-1248, Aroclor-1254, and Aroclor-1260. Each drum sample that had detected levels of PCBs contained more than one aroclor identified by the laboratory. PCB aroclor results may be false positives or biased high due to overlapping quantitation peak contribution from other aroclors. For example, Aroclor 1254 and Aroclor 1260 have overlapping chromatographic peaks when they are present in the same sample.

Each PCB aroclor has a signature pattern of peaks. When there is overlap, quantitation should be performed using only those peaks that can be unambiguously assigned to a specific Aroclor; *i.e.*, are "unique." If done in this way, the Calibration Factors (CFs) used for quantitation must also be adjusted to use only those peaks in the standards that are equivalent to those chosen in the samples.

Since raw data chromatograms were not included in the HRS record to support these PCB results (Reference #8), NEH cannot be certain that the laboratory excluded co-eluting peaks from the quantitation. In the absence of raw data, NEH was unable to confirm that "unique" peaks were chosen for quantitation of each PCB Aroclor result. Furthermore, without the laboratory data sheets, we were unable to recalculate the concentrations of these aroclors in the samples to determine the magnitude of the error potentially made by the reporting laboratory. Therefore, the conservative approach, consistent with USEPA guidance (1996), is to assume a potential high bias in the PCB Aroclor data and divide the results by the USEPA adjustment factor of 10 (see Table 3, Factors for Pesticides/PCB Analytes, USEPA 1996). The corrected data are presented in Table 3-3, below.

Table 4. 1999 Drum Sample Results for PCBs Adjusted Using USEPA Guidance

Chemical	Sample ID	Concentration Reported	USEPA Adjustment Factor[1]	Adjusted 1999 Drum Sample Result[2]	Usability Assessment
PCB Aroclor-1248	D-102	1720 mg/Kg[3]	10	172 mg/Kg[3]	Potentially Usable at adjusted concentration if units are correct - see note[3]
PCB Aroclor-1254	D-112	2871 mg/Kg[3]	10	287 mg/Kg[3]	Potentially Usable at adjusted concentration if units are correct - see note[3]
PCB Aroclor-1260	D-02	1490 mg/Kg[3]	10	149 mg/Kg[3]	Potentially Usable at adjusted concentration if units are correct - see note[3]

[1]Adjustment factors are from USEPA 1996 guidance, Table 3, Factors for Pesticides/PCB Analytes.
[2]Results were adjusted by dividing the concentration reported by the USEPA adjustment factor.
[3]These compounds are usually reported in units of µg/kg; however, they were tabulated in Reference #8 in units of mg/kg. As the sample data sheets were missing from the HRS record, NEH could not verify the units of these measurements. Therefore, the reported values could potentially be three orders-of-magnitude (1000 times) too high.

1.3.2.2 Overland/Flood Migration Component - Observed Release by Chemical Analysis

The chemical data presented in the HRS to document the observed release were from sediment samples collected in the Mississippi River adjacent to Site R. Three of the four "background" sample locations are in the river upstream of Site R but downstream of Site P. Therefore, these "background" samples are inappropriate to define background for potential releases from Site P

because they are downstream of this potential source. The implications for scoring Site P are presented in Section 2.1.1.

The chemical data presented were validated, however, no validation report was provided in the HRS record (Reference #23). Therefore, the HRS record is deficient and fails to satisfy the USEPA requirements (USEPA 1992 and 1996) of documentation of data quality and evaluation of bias (as previously described in Sections 1.3).

USEPA guidance in the HRS Guidance Manual (1992, p.74) requires that "environmental conditions at both the background and release sample locations should be similar." The "background" and "release" sediment samples collected in the Mississippi River and included in the HRS pp. 39-40 are not similar for all samples tabulated, based on total organic carbon (TOC) results. Similarity or comparability of sediments is generally measured by the qualitative approach of evaluation of ecological habitat and the quantitative approach of TOC and grainsize measurements. Grainsize measurements were made for these sediments (as indicated in Reference #23); however, grainsize data were missing from the HRS record. The lack of grainsize results limits the usability of the "release" and "background" data to establish an observed release because the requirement that the sample locations should be similar has not been satisfied. The effect of non-comparability of release samples is discussed in Section 2.1.2.

Given the uncertainty due to lack of grainsize data, comparability of background and release sediments were quantitatively evaluated using the TOC data present in HRS Reference #23. The four background sediment samples had no detectable TOC. Only four of the nine release samples tabulated in the HRS (p.40) also had no detectable TOC. The remaining five samples had TOC ranging from 390 mg/kg to 11,000 mg/kg. These levels are significantly higher than the non-detected TOC in the background samples. Therefore, the background samples tabulated in the HRS are only comparable to four of the release samples. Results for the other five samples are considered unusable to establish an observed release (see Table 5 below).

Furthermore, one sediment result for chlorobenzene was reported at a level less than the SQL for the non-detected background sample. As previously discussed, results less than the SQL (or CRQL) cannot be used to establish an observed release. The usability assessment of these "background" and "release" sediment sample results are tabulated below (Table 5).

Table 5. "Release" and "Background" Sediment Results

Chemical	Sample ID	Concentration Reported	Background Concentration[2]	Usability Assessment
Chlorobenzene	SD-2-50	6.5 µg/Kg TOC=ND[1]	ND SQL=7.1 µg/kg	Unusable – result is less than SQL of background sample
	SD-2-150	390 µg/kg TOC=ND	ND SQL=7.1 µg/kg	Potentially Usable[3] based on TOC comparability to background sample
	PDA-8-60	700 µg/kg TOC=510 mg/kg	ND SQL=7.1 µg/kg	Unusable – sample locations are not comparable based on TOC
	PDA-5-R-60	450 µg/kg TOC=390 mg/kg	ND SQL=7.1 µg/kg	Unusable – sample locations are not comparable based on TOC
	SD-5-315	3100 µg/kg TOC=7400 mg/kg	ND SQL=7.1 µg/kg	Unusable – sample locations are not comparable based on TOC
	PDA-2-60	10000 µg/kg TOC=11000 mg/kg	ND SQL=7.1 µg/kg	Unusable – sample locations are not comparable based on TOC
	SD-6-90	8 µg/kg TOC=1100 mg/kg	ND SQL=7.1 µg/kg	Unusable – sample locations are not comparable based on TOC
	SD-7-150	1600 µg/kg TOC=ND	ND SQL=7.1 µg/kg	Potentially Usable[3] based on TOC comparability to background sample
4-Chloroaniline	PDA-5-R-60	3300 µg/Kg TOC=390 mg/kg	ND SQL=410 µg/kg	Unusable – sample locations are not comparable based on TOC

Chemical	Sample ID	Concentration Reported	Background Concentration[2]	Usability Assessment
	PDA-2-60	720 µg/kg TOC=11000 mg/kg	ND SQL=410 µg/kg	Unusable – sample locations are not comparable based on TOC
1,4-Dichlorobenzene	SD-5-150	1700 µg/kg TOC=7400 mg/kg	ND SQL=410 µg/kg	Unusable – sample locations are not comparable based on TOC
4,4'-DDD	PDA-5-R-60	14 µg/kg TOC=390 mg/kg	ND SQL=2.1 µg/kg	Unusable – sample locations are not comparable based on TOC

[1]ND = Not detected
[2]All background TOC results were ND. SQL = sample quantitation limit.
[3]Grainsize data need to be assessed to complete the quantitative evaluation of comparability between the release and background sample locations. Since only TOC data were available for review, these results are only "potentially" usable, and cannot be used unless grainsize data are also evaluated.

1.3.2.3 Groundwater to Surface Water Component

USEPA inappropriately used the guidance document, *Using Qualified Data to Document an Observed Release* (USEPA 1996) to bias correct (adjust) unvalidated data tabulated in the groundwater to surface water component of the surface water pathway, HRS tables pp.55-59. USEPA failed to validate the data against the stringent DUC level requirements in *Guidance for Performing Site Inspections Under CERCLA* (USEPA 1992) and failed to use validated data to establish an observed release and to perform bias adjustments as required in *Using Qualified Data to Document an Observed Release* (USEPA 1996).

The laboratory narratives included in Reference #9 state numerous quality control exceedances that must be evaluated during a data validation to determine the potential bias in the results. Without data validation, the groundwater data presented in the HRS are not usable to establish an observed release because the data are of unknown quality and do not satisfy either USEPA requirements specified in *Guidance for Performing Site Inspections Under CERCLA*, USEPA 1992, or in *Using Qualified Data to Document an Observed Release*, USEPA 1996. Therefore, all of the groundwater data tabulated in the HRS pp. 55-59, inclusive of the "background" and "release" chemical results, are unusable to establish an observed release for the groundwater to surface water component of the surface water pathway. The effect on site scoring is presented in Section 2.1.2.

Even if these groundwater data were to be validated, eleven results are considered unusable based on USEPA 1996 guidance because they were found at levels below the sample quantitation limit. Only results greater than the SQL or contract required quantitation limit (CRQL) are usable to establish an observed release (see Section 1.3.2.1 for further details about this requirement). Many of the SQLs listed in the HRS tables, pp.55-59, were incorrect because the appropriate sample-specific dilution factors were not included. Table 6, below, lists the groundwater results that are unusable to establish an observed release for the groundwater to surface water component of the surface water pathway because they are less than the SQL. Corrected SQLs are included in this table, as needed, and a footnote documenting this change has been added.

Table 6. Chemical Results that are Unusable to Establish an Observed Release by Groundwater to Surface Water Component [Found at Levels Less Than the SQL] [1]

Chemical	Sample ID	Concentration Reported + Lab Qualifier[2]	SQL	Reference
4,4'-DDE	G108	0.015 J µg/L	0.1 µg/L	9, p. B-63
	G109	0.0044 J µg/L	0.1 µg/L	9, p. B-69
Aroclor 1242	G109	0.32 J µg/L	1 µg/L	9, p. B-69
Aroclor 1248	G109	0.2 J µg/L	1 µg/L	9, p. B-69
Aroclor 1254	G108	0.55 J µg/L	1 µg/L	9, p. B-63
Endosulfan I	G108	0.0018 J µg/L	0.05 µg/L	9, p. B-63
Nickel	G108	23.9 B µg/L	40 µg/L	9, p. C-11
	G109	15.2 B µg/L	40 µg/L	9, p. C-12
Chloroform	G104	150 J µg/L	200 µg/L	9, p. B-33
1,2-Dichlorobenzene	G104	680 J µg/L	1000 µg/L[3]	9, p. B-37
4-Methyl phenol	G104	450 J µg/L	1000 µg/L[3]	9, p. B-37

[1]These groundwater data were not validated and are therefore not usable. This table is presented inclusive of these data to demonstrate that even if these results were validated, they would be unusable to establish the observed release because they were found at levels less than the SQL.
[2]The lab qualifier "J" means that the result was reported at a level below the SQL. The lab qualifier "B" is used for metals for results reported at a level below the SQL or Contract Required Detection Limit (CRDL).
[3]The SQL tabulated in the HRS was incorrect for this compound. This is the corrected SQL which takes into account the sample-specific dilution factors.

1.3.3 Summary of Usability of Data to Establish Observed Release for Surface Water Pathway

The HRS presents chemical data to establish an observed release for both the overland/flood migration component and groundwater to surface water migration component of the Surface Water Pathway. During this data usability assessment, NEH found numerous deficiencies in the technical approach, documentation, and quality of the data presented in the HRS as summarized below.

- All of the soil Overland/Flood Migration data for Source Q collected in 1994, pp.35-36 of HRS and Reference #25, are unusable to establish an observed release because the data are of unknown and undocumented quality (not validated).
    - Even if validation were provided, numerous results are unusable to establish an observed release because they were found at levels below the contract required quantitation limit (CRQL).
- All of the drum data collected in 1999, pp. 36-38 of HRS and Reference #8, are unusable to establish an observed release by direct observation because no evidence exists that the drum data from 1999 removal action are the same surface drums "observed" in 1993 potentially exposed to flood waters.
    - Ten results from the Overland/Flood Migration Drum sample data collected at Source Q in 1999, pp. 36-28 of HRS and Reference #8 are unusable to establish an observed release because they were found at levels below the CRQL.
    - Units of measurement for all chemicals in HRS table are listed as "mg/Kg." Organic compounds are commonly reported in units of "µg/Kg". If the units are incorrect, the results are potentially three orders-of-magnitude lower (1000 times) than those reported.
    - USEPA failed to apply 1996 guidance to adjust the Drum sample data for potential bias.
    - The PCB Aroclor results are biased high due to potential "double-counting" of chromatographic peaks for multiple aroclors identified in the samples. Application of USEPA adjustment factors performed during this assessment.
    - Uncertainty in usability of these validated data because the validation report is missing from the HRS record; therefore the USEPA documentation requirement of the quality and bias in the results was not met.
- Nine chemical results (representing five sample locations) presented for the "release" sediments collected in the Mississippi River in 2000, p. 40 of HRS and Reference #23, are unusable to establish an observed release because the sample locations are not comparable to the "background" locations.
    - One additional result is unusable because it was found at less than the sample quantitation limit.
    - Uncertainty in usability of these validated data because the validation report is missing from the HRS record; therefore the USEPA documentation requirement of the quality and bias in the results was not met.

  - No observed release is established for 4-chloroaniline, 1,4-dichlorobenzene, or 4,4'-DDD due to non-comparability of "release" and "background" locations based on total organic carbon results.
  - The final result for chlorobenzene is unusable because grainsize data are missing from the HRS record. Reference #23.
- All of the groundwater data presented for the groundwater to surface water migration component, collected in 1999 and tabulated on pp. 55-59 of the HRS (Reference #9) are unusable to establish an observed release because the data are of unknown and undocumented quality (not validated).
  - Even if validation were provided, eleven results are unusable to establish an observed release because they were found at levels below the sample quantitation limit (SQL).
  - USEPA inappropriately applied the 1996 guidance to unvalidated results.
  - Numerous SQLs reported in the HRS are incorrect and do not account for sample-specific dilutions.

1.4 Risks Due to Bioaccumulative Compounds in the Mississippi River are Undocumented

The HRS Documentation Package for Sauget Area 2 identifies a list of bioaccumulative compounds that it associates with one or more sources and which it purports to be posing a hazard or risk via the surface water migration pathway to the river. The compounds identified in the HRS Package include:

Pesticides/Herbicides	PCBs	PAHs
4,4'-DDD	Aroclor-1016	Benzo(a)anthracene
4,4'-DDE	Aroclor-1232	Benzo(a)pyrene
4,4'-DDT	Aroclor-1242	
Aldrin	Aroclor-1248	
Dieldrin	Aroclor-1254	
Endosulfan I	Aroclor-1260	
Endosulfan II		
Endrin		
Heptachlor		
Heptachlor epoxide		
Methoxychlor		

To provide a "reality check" on this purported source → migration pathway → target = hazard (risk) conceptual model for bioaccumulative compounds, we examined the available sediment data presented in the river as well as the sediment data collected by Solutia in 2000 but which the Agency chose not to discuss. Data are available for both sediments and fish. In addition, a risk

assessment was carried out using the fish data to determine whether there were risks to wildlife species that may eat the fish. Fish species were selected based on discussions with USEPA to

cover the major trophic pathways. Part of this sampling effort also yielded fish data to support the human health risk assessment.

The HRS Documentation Package supports an assessment that bioaccumulative compounds are either absent or at very low levels in the river. For example, 4,4'-DDD is the only bioaccumulative compound (from the list above) for which data are tabulated by USEPA in an effort to support an observed release by chemical analysis (although the result is unusable because the sample location was not comparable to the background sampling locations). The maximum sediment concentration observed in sediments off Site R in 2000 for this chemical is 0.014 ppm, a value that is well below levels that would pose a risk, were the result usable. Very low levels of a few other bioaccumulative compounds were detected in sediments collected by Tetra Tech and the HRS Documentation Package refers to these in passing, These were all well below levels that the Agency typically assumes to pose a risk.

Sediment samples from the river were also collected by Solutia during 2000 and analyzed for the bioaccumulative compounds listed by USEPA in the HRS Documentation Package. These samples were collected primarily off Site R but also include reference stations. These data were validated and found acceptable for use in risk assessments. The data have been provided to the USEPA and the Agency relied on splits from some of these sampling locations in its HRS Scoring Package for Sauget Area 2. The findings for the bioaccumulative compounds used by USEPA in scoring the site are described in the following table for sediments along the Illinois side of the river (Site R and upstream and downstream reference areas).

Compound	**Concentration in River Sediment off Site R and Upstream and Downstream Reference Areas**
4,4'-DDD	Detected at a very low level in one study area sample and not detected in any of the other study area and reference samples
4,4'-DDE	Not detected in any of the study area and reference samples
4,4'-DDT	Not detected in any of the study area and reference samples
Aldrin	Not detected in any of the study area and reference samples
Aroclor-1016	Homolog data only - Not detected in any of the study area and reference samples

Compound	Concentration in River Sediment off Site R and Upstream and Downstream Reference Areas
Aroclor-1232	Homolog data only - Not detected in any of the study area and reference samples
Aroclor-1242	Homolog data only - Not detected in any of the study area and reference samples
Aroclor-1248	Homolog data only - Not detected in any of the study area and reference samples
Aroclor-1254	Homolog data only - Not detected in any of the study area and reference samples
Benzo(a)pyrene	Not detected in any of the study area and reference samples
Benzo(a)anthracene	Not detected in study area sediments and the upstream reference area sediments. Detected in the downstream sediment
Dieldrin	Not detected in any of the study area and reference samples
Endosulfan I	Not detected in any of the study area and reference samples
Endosulfan II	Not detected in any of the study area and reference samples
Endrin	Not detected in any of the study area and reference samples
Heptachlor	Not detected in any of the study area and reference samples
Heptachlor Epoxide	Not detected in any of the study area and reference samples
Methoxyclor	Not detected in any of the study area and reference samples

As the table indicates, the sediments that have been investigated do not contain elevated levels of the bioaccumulative compounds that the HRS Documentation Package is presuming to pose a hazard to the river. In fact, most of these compounds are not detected.

Solutia has submitted a baseline ecological risk assessment for the aquatic habitat of the Mississippi River as part of the RCRA Program for the W.G. Krummrich Plant in Sauget, Illinois [USEPA Docket Number R8H-5-00-003]. This report provides insight into the nature of risks. The assessment specifically considered the foodchain pathways that are a key component of the HRS scoring for Sauget Area 2.

Warm water resident fish species were selected to reflect local sediment and water quality conditions. The typical warm water fish species such as the gizzard shad and bottom feeding fish such as channel catfish and drum are abundant local residents with a limited foraging range. Composites of these fish species were collected to assess potential bioaccumulation of contaminants of potential concern. These species were selected because they are:

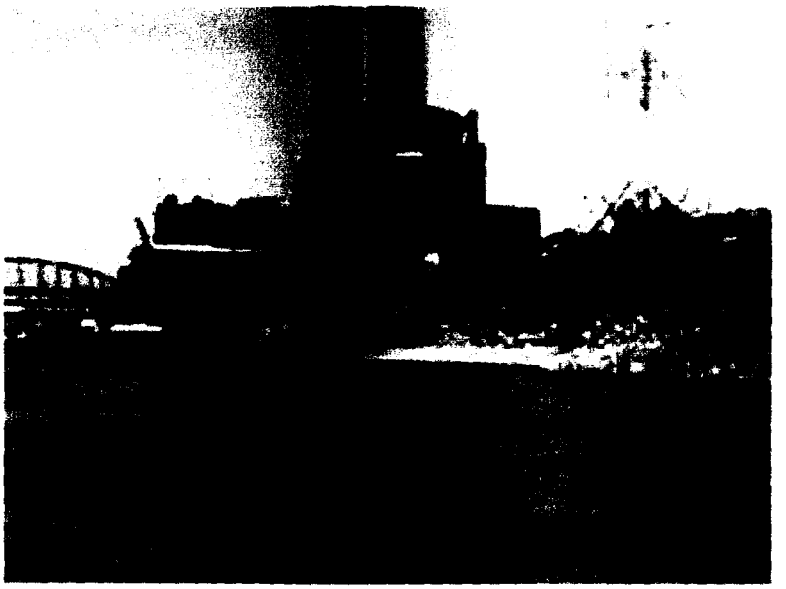
Common Mississippi River residents;
Exposed to sediment as well as surface water;
Have limited foraging areas;
Represent fish and higher order predators feeding on smaller fish and invertebrates; and
Serve as a prey base for avian and mammalian species.

The drum, gizzard shad and channel catfish represent major groups of fish in the Mississippi River. Buffalofish fillets were also examined for the human health risk assessment.

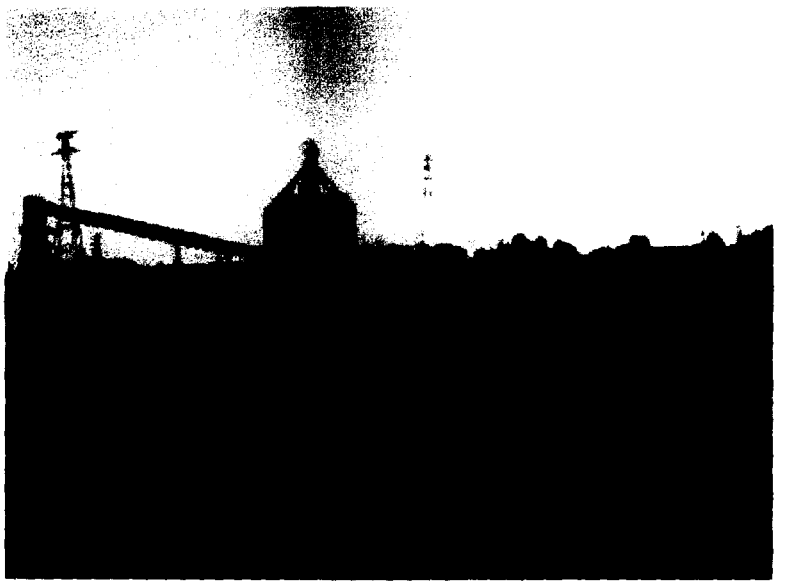
Composite samples were collected from three areas. The study area adjacent to Site R, an upstream reference area and a downstream reference area. The assessment concluded that the risks to wildlife associated with these exposure pathways for the bioaccumulative compounds were low.

The HRS Documentation Package presumes that fishing, in particular, bank fishing, occurs in the river at and downstream of Sauget Area 2. We have observed bank fishing north (i.e., upstream) of the site just below the railroad bridge but not along the site. We confirmed these observations with Dick Burke (Eagle Marine) who is familiar with activities along the bank of Sauget Area 2. He observed that the industrialized nature of the bank and lack of accessibility makes such activities unlikely and they have not observed bank fishing along the river frontage of Site Q. He concurs that bank fishing does occur elsewhere in the area but not along the riverfront at Sites R or Q.

In summary, access to the bank along the site is limited because of gates, security, and the industrialized characteristics of the bank. These conditions are illustrated below. The northern (most upstream) portion of Sauget Area 2 is characterized by a steep rip rap bank. This is an extremely difficult place to walk and access to it is limited by security fences. The picture below is taken of the shoreline off Site R looking north. Site R is on the right side of the picture with the defunct Union Electric power plant just upstream. The railroad trestle can be seen even farther upstream. We observed bank fishing immediately below the trestle but not along the site.



The bank along Site Q is also characterized by industrial development.



The HRS Scoring package has presumed that bank fishing is occurring along Sauget Area 2 and that there is a potential for people to be exposed to highly bioaccumulative and toxic compounds that are emanating from the Site into the river. This presumption is not supported by observations.

bioaccumulative compounds such as PCBs are either not present in sediment or fish or are at very low levels.

2.0 Re-Scoring of Sauget Area 2 Under the Hazard Ranking System Based on the Technical Comments

2.1 Re-Scoring for Disaggregated Sources in Sauget Area 2

As discussed in Section 1.1, the five disparate sites should not be aggregated based on the four criteria outlined in the HRS Guidance (USEPA, 1992). The remainder of this comment document discusses the effects of USEPA's misrepresentation of the data on the scores of the individual sites, and also presents a rescored composite result for the aggregated sites.

2.1.1 Scenario 1 - Data were used inappropriately to identify hazardous substances available to migrate via the surface water pathway (via groundwater and overland flow)

As discussed in Section 1.2, the data used to support an observed release by direct observation are not usable for HRS purposes because they do not meet the data usability requirements of the HRS and the various observations used to support an observed release by "direct observation" are not linked in time and space. Also, sediment data used as evidence of an observed release by chemical analysis do not support an observed release for the sources listed in the HRS Documentation Package.

As also discussed in Section 1.2, groundwater data used in the HRS Documentation to establish an observed release for the groundwater to surface water component are not validated and therefore unusable for the purposes of HRS scoring.

Therefore, we scored each source in Area 2 individually making the following changes:

a. An observed release for the overland/flood migration cannot be documented for any of the sources. Therefore, we assign a maximum potential to release score of 500 to score the overland/flood migration component of the surface water migration pathway.
b. An observed release to groundwater cannot be documented for any of the sources. Therefore, we assign the maximum potential to release score of 400 in scoring the groundwater to surface water component of the surface water migration pathway.

Scenario 1 – Site O Score
Groundwater to Surface Water Migration Component

FACTORS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
PATHWAYS				
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**400**	**18**	**6.00E-09**	**0.00**
Environmental (env)	**400**	**100**	**8.5E-05**	**0.00**
Surface water (SW)				**0.00**

INDIVIDUAL SITE SCORE = 0.00

Notes:
NS = Not Scored
Numbers in **bold** have changed from the original scoring values in the HRS Documentation for Area 2.

Scenario 1 – Site P Score
Groundwater to Surface Water Migration Component

FACTORS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
PATHWAYS				
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**400**	**56**	**9.00E-09**	**0.00**
Environmental (env)	**400**	**100**	**1.28E-04**	**0.00**
Surface water (SW)				**0.00**

INDIVIDUAL SITE SCORE = 0.00

Notes:
NS = Not Scored
Numbers in **bold** have changed from the original scoring values in the HRS Documentation for Area 2.

Scenario 1 – Source Q Score
Surface Water Overland/Flood Migration Component

FACTORS PATHWAYS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**500**	320	**3.00E-08**	**0.00**
Environmental (env)	**500**	320	**4.25E-04**	**0.00**
Surface water (SW)				**0.00**

Groundwater to Surface Water Migration Component

FACTORS PATHWAYS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**400**	**100**	**1.20E-08**	**0.00**
Environmental (env)	**400**	**100**	**1.70E-04**	**0.00**
Surface water (SW)				**0.00**

SITE SCORE = 0.00

Notes:
NS = Not Scored
Numbers in **bold** have changed from the original scoring values in the HRS Documentation for Area 2.

Scenario 1 – Source R Score
Surface Water Overland/Flood Migration Component

FACTORS PATHWAYS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**500**	320	**3.00E-08**	**0.00**
Environmental (env)	**500**	320	**4.25E-04**	**0.00**
Surface water (SW)				**0.00**

Groundwater to Surface Water Migration Component

FACTORS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
PATHWAYS				
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**400**	**100**	**1.20E-08**	**0.00**
Environmental (env)	**400**	**180**	**1.70E-04**	**0.00**
Surface water (SW)				**0.00**

INDIVIDUAL SITE SCORE = 0.00

Notes:
NS = Not Scored
Numbers in **bold** have changed from the original scoring values in the HRS Documentation for Area 2.

Scenario 1 – Site S Score
Groundwater to Surface Water Migration Component

FACTORS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
PATHWAYS				
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**400**	**56**	**9.00E-09**	**0.00**
Environmental (env)	**400**	**100**	**1.28E-04**	**0.00**
Surface water (SW)				**0.00**

INDIVIDUAL SITE SCORE = 0.00

Notes:
NS = Not Scored
Numbers in **bold** have changed from the original scoring values in the HRS Documentation for Area 2.

2.1.2 Scenarios 2 – Data were used inappropriately to identify hazardous substances available to migrate via the surface water pathway (via groundwater and overland flow). Aggregation of the five sites is assumed to be appropriate.

Even if we assume that the five Sites should be aggregated (although as discussed in Section 1.1.1 this is not appropriate, the resulting score for the aggregated site is below the 28.5 threshold. We re-scored Area 2 making the following changes:

a. An observed release for the overland/flood migration component cannot be documented for any of the sources. Therefore, we assign a maximum potential to release score of 500 to score the overland/flood migration component of the surface water migration pathway.
b. An observed release to groundwater cannot be documented for any of the sources. Therefore, we assign the maximum potential to release score of 400 in scoring the groundwater to surface water component of the surface water migration pathway.

Scenario 2 – Score for Aggregated Sites

Surface Water Overland/Flood Migration Component

FACTORS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
PATHWAYS				
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**500**	320	**3.00E-08**	**0.00**
Environmental (env)	**500**	320	**4.25E-04**	**0.00**
Surface water (SW)				**0.00**

Groundwater to Surface Water Migration Component

FACTORS	LIKELIHOOD OF RELEASE	WASTE CHARACTERISTICS	TARGETS	PATHWAY SCORE
PATHWAYS				
Drinking water (dw)	NS	NS	NS	NS
Food chain (fc)	**400**	**320**	**1.20E-08**	**0.00**
Environmental (env)	**400**	**560**	**1.70E-04**	**0.00**
Surface water (SW)				**0.00**

AGGREGATED SITE SCORE = 0.00

Notes:
NS = Not Scored
Numbers in **bold** have changed from the original scoring values in the HRS Documentation for Area 2.

3.0 References

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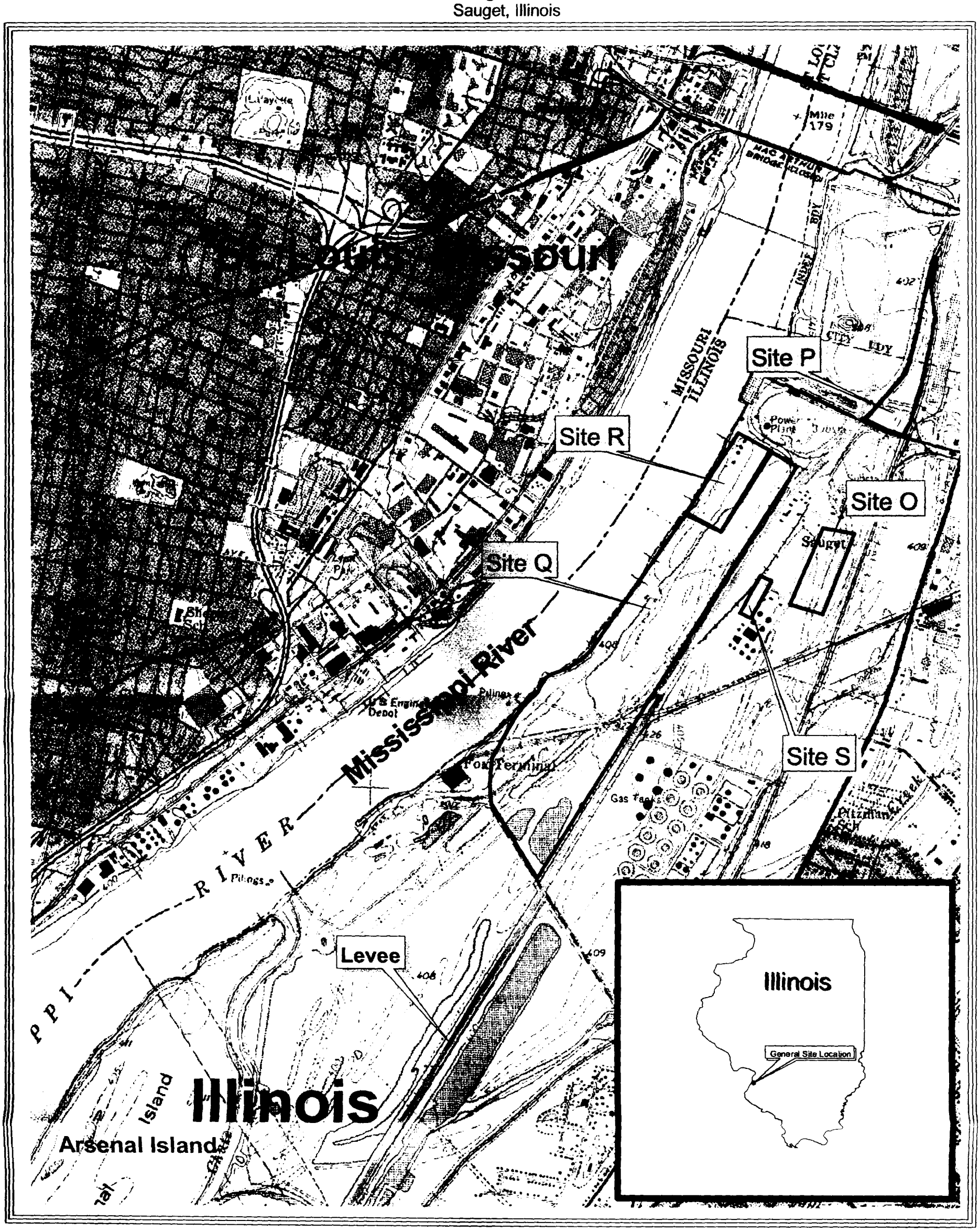
FIGURES

Figure 1 Source Locations According to USEPA
Sauget Area 2
Sauget, Illinois

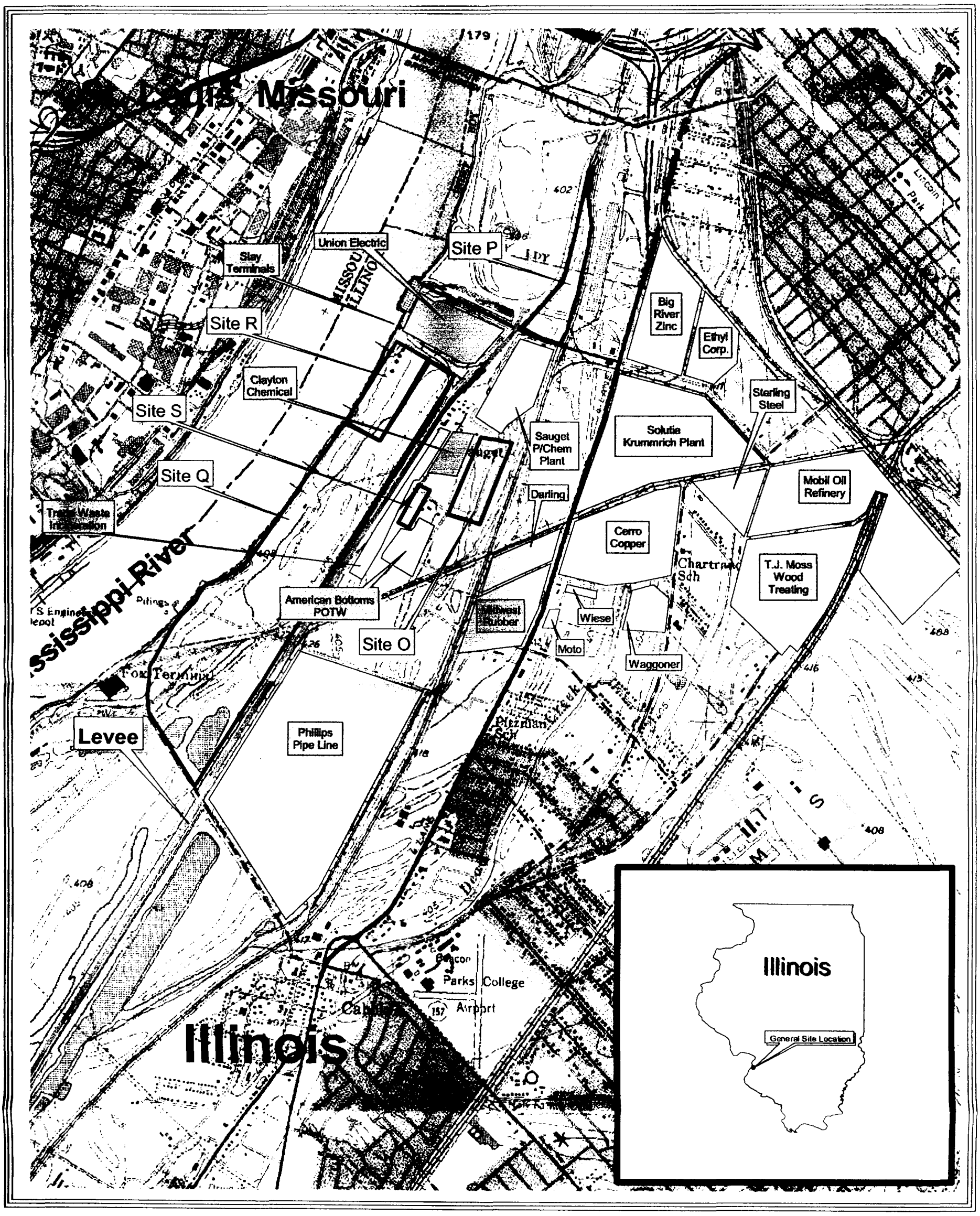


0.6 0 0.6 1.2 Miles

N
W E
S

Note: site boundary and levee locations are approximate

Figure 2 Industrial Facilities in the Vicinity of Area 2
Sauget Area 2
Sauget, Illinois



0.6 0 0.6 1.2 Miles

N
W E
S

Note: site boundary and levee locations are approximate